

Claims

We claim:

1. A method for generating a curve on a surface, comprising:
selecting a parameterization of the surface, wherein the parameterization
5 corresponds to a parameter space;
selecting a first curve in the parameter space;
determining a re-parameterization of the surface based on a metric of the surface;
and
mapping the first curve in the parameter space onto the surface based on the re-
10 parameterization, to generate the curve;
wherein the curve is useable in analyzing the surface.
2. The method of claim 1, further comprising:
generating output comprising the generated curve on the surface.
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3. The method of claim 1,
wherein the first curve is a Low Discrepancy Curve in the parameter space; and
wherein the generated curve is a Low Discrepancy Curve on the surface.
- 20 4. The method of claim 1, wherein the parameter space comprises a 2D
rectangle.
5. The method of claim 1, wherein the parameter space comprises one of a
unit square, a unit cube, or a unit hyper-cube.
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6. The method of claim 1, wherein the parameter space comprises a unit n-
dimensional cube, wherein the dimensionality n is greater than 4.

7. The method of claim 1, wherein the metric of the surface is a Riemannian metric.

8. The method of claim 1, wherein the surface comprises a space with
5 dimensionality greater than two.

9. The method of claim 1,
wherein the surface comprises a six-dimensional space comprising three position
degrees of freedom and three orientation degrees of freedom for an object; and
10 wherein the generated curve comprises a scan path useable in scanning the space.

10. The method of claim 9, further comprising:
scanning the space, wherein said scanning the space is performed to determine an
optimum position and orientation for the object.
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11. A method for generating a curve on a surface of an object, comprising:
selecting a parameterization of the surface, wherein the parameterization
corresponds to a parameter space;
selecting a first curve in the parameter space;
20 determining a re-parameterization of the surface based on a metric of the surface;
and
mapping the first curve in the parameter space onto the surface based on the re-
parameterization, to generate the curve;
wherein the curve is useable in analyzing the object.
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12. The method of claim 11, further comprising:
generating output comprising the generated curve on the surface.

13. The method of claim 11, further comprising:

analyzing the object using the curve.

14. The method of claim 11, further comprising:
determining a property of the object using the curve.

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15. The method of claim 1,
wherein the first curve is a Low Discrepancy Curve in the parameter space; and
wherein the generated curve is a Low Discrepancy Curve on the surface.

10 16. The method of claim 1, wherein the parameter space comprises a 2D
rectangle.

17. The method of claim 1, wherein the parameter space comprises one of a
unit square, a unit cube, or a unit hyper-cube.

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18. The method of claim 1, wherein the parameter space comprises a unit n-
dimensional cube, wherein the dimensionality n is greater than 4.

19. The method of claim 1, wherein the metric of the surface is a Riemannian
20 metric.

20. The method of claim 1, wherein the surface comprises a space with
dimensionality greater than two.

25 21. A memory medium which is operable to store program instructions for
generating a curve on a surface, wherein said program instructions are executable to
perform:

storing a parameterization of the surface, wherein the parameterization
corresponds to a parameter space;

storing a first curve in the parameter space;
determining a re-parameterization of the surface based on a metric of the surface;
and

mapping the first curve in the parameter space onto the surface based on the re-
5 parameterization, to generate the curve;
wherein the curve is useable in analyzing the surface.

22. The memory medium of claim 21, wherein the program instructions are
further executable to perform:
10 generating output comprising the generated curve on the surface.

23. The memory medium of claim 21,
wherein the first curve is a Low Discrepancy Curve in the parameter space; and
wherein the generated curve is a Low Discrepancy Curve on the surface.
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24. The memory medium of claim 21, wherein the parameter space comprises
one of a 2D rectangle, a unit square, a unit cube, or a unit hyper-cube.

25. The memory medium of claim 21, wherein the parameter space comprises
20 a unit n-dimensional cube, wherein the dimensionality n is greater than 4.

26. The memory medium of claim 21, wherein the metric of the surface is a
Riemannian metric.

25 27. The memory medium of claim 21, wherein the surface comprises a space
with dimensionality greater than two.

28. The memory medium of claim 21,
wherein the surface comprises a surface of an object;

wherein the curve comprises a scan path useable to scan the object;
wherein the program instructions are further executable to perform:
scanning the object to determine one or more properties of the object.

5 29. The memory medium of claim 21,
 wherein the surface comprises a six-dimensional space comprising three position
 degrees of freedom and three orientation degrees of freedom for an object;
 wherein the generated curve comprises a scan path useable in scanning the six-
 dimensional space;
10 wherein the program instructions are further executable to perform:
 scanning the six-dimensional space to determine an optimum position and
 orientation of the object.

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15 30. A system for generating a curve on a surface, comprising:
 a CPU; and
 a memory medium which is operable to store one or more software programs;
 wherein said CPU is operable to execute said one or more software programs to
 perform:
 selecting a parameterization of the surface, wherein the parameterization
20 corresponds to a parameter space;
 selecting a first curve in the parameter space;
 determining a re-parameterization of the surface based on a metric of the
 surface; and
 mapping the first curve in the parameter space onto the surface based on
25 the re-parameterization, to generate the curve;
 wherein the curve is useable in analyzing the surface.

31. The system of claim 30, wherein the CPU is further operable to execute
said one or more software programs to perform:

